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10/548,315

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Hideshi Iki

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EXAMINER

SINGH, PREM C

ART UNIT

PAPER NUMBER

1797

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/548,315 | Applicant(s) IKI ET AL. | |
| | Examiner PREM C. SINGH | Art Unit 1797 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6,8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,8 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/05/2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4, 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al (US Patent 6,217,748) in view of Waku et al (US Patent 5,741,414).

4. With respect to claims 1 and 2, Hatanaka discloses a process for hydrotreatment of a gas oil fraction (See abstract), the process comprising;

providing as a feed oil a hydrotreated petroleum based hydrocarbon oil with a sulfur content of 10 ppm by mass (See column 9, lines 25-29) with a boiling point range of 200 to 380°C (See column 6, lines 56-62), and

subjecting said feed oil to hydrotreatment in the presence of a hydrogenation catalyst including at least one active metal selected from the group consisting of a Group VIII metal, including Ru, Pd and Pt (See column 4, lines 11-21) to obtain an

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ultralow sulfur gas oil fraction having a further reduced sulfur content (See claim 2, column 10, lines 54-57).

Hatanaka invention also discloses, "As the light fraction separated by distillation scarcely contains sulfur, it can be used as itself as a deep desulfurized diesel gas oil" (See column 5, lines 3-5). Obviously, Hatanaka produces a gas oil fraction with negligible sulfur content starting with a diesel gas oil feed with 1-2 wt% sulfur (See column 6, lines 63-67; column 7, lines 1-3).

Hatanaka invention does not specifically disclose aromatics content of the gas oil feed and gas oil product.

Waku invention discloses a hydrotreating process similar to Hatanaka using feed, catalyst, and operating conditions similar to Hatanaka to produce gas oil containing low-sulfur and low aromatics content (See abstract).

It is to be noted that Waku starts with a gas oil feed having sulfur content of 0.98 wt % and aromatics content of 39% (See column 5, lines 46-48) and produces a hydrotreated gas oil product with sulfur content of about 90 ppm (99% desulfurization) and aromatics content of 17 wt% (56% dearomatization) (See Table 2, column 7, lines 27-29). Obviously, Waku invention shows that the gas oil feed used in Hatanaka invention should inherently have aromatics and dearomatization should simultaneously be taking place along with desulfurization. Also, assuming that the degree of desulfurization and dearomatization achieved in Waku invention is also achieved in Hatanaka invention, it is expected that Hatanaka should necessarily produce a gas oil fraction with sulfur and aromatics in a range, including as claimed.

Thus, it would have been obvious to one skilled in the art at the time of invention to modify Hatanaka invention and specify the aromatics content along with the sulfur content of the gas oil feed and product as disclosed by Waku. It is expected that in Hatanaka's process also the product gas oil fraction with negligible sulfur should necessarily have aromatics content in a range as claimed because Hatanaka is using similar feed, catalyst and operating conditions as claimed by the Applicant.

Although Waku does not specifically disclose monocyclic and bicyclic aromatics content, however, the invention does disclose the total aromatics content (See Table 1 and 2). Thus, it would have been obvious to one skilled in the art at the time of invention to specify the monocyclic and bicyclic aromatics content for proper characterization of the finished gas oil. Since the total aromatics content of the feed gas oil in Waku invention is in the claimed range, it is expected that the monocyclic and bicyclic aromatics content separately, will necessarily be in a range as claimed.

5. With respect to claim 3, Hatanaka discloses hydrotreatment conditions with temperature 320°C, pressure 3 MPa, LHSV = 1 h⁻¹ and hydrogen to oil ration of 1000 scf/bbl (See column 9, lines 26-29).

6. With respect to claim 4, Hatanaka invention does not specifically disclose paraffin and naphthene content of feed oil and the hydrotreated oil, however, the invention does disclose using a feed with a boiling range of 200 to 380°C comprising diesel gas oil such as straight run diesel gas oil, catalytic cracking diesel gas oil and vacuum gas oil

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(See column 6, lines 56-62) similar to the Applicant's claim. Since a typical gas oil will inherently have paraffin, naphthene, and aromatics content in a typical range, it is expected that the paraffin and naphthene content of the feed oil and the hydrotreated oil in Hatanaka invention should necessarily be in the claimed range.

7. With respect to claim 6, Hatanaka invention discloses that the hydrogenation catalyst includes a porous support comprising alumina, titania, zirconia, boria and silica (See column 4, lines 11-21).

8. With respect to claims 8 and 9, combined inventions of Hatanaka and Waku disclose the steps and the process required to produce the claimed ultralow sulfur and low aromatic gas oil fraction with negligible sulfur and not greater than 1% aromatics. The process steps are discussed under claim 1. It is expected that the ultralow sulfur and low aromatics gas oil obtained in the combined hydrotreatment process of Hatanaka and Waku meets the Applicant's claim.

Response to Arguments

9. Applicant's arguments filed 06/05/2009 have been fully considered but they are not persuasive.

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10. In the arguments on page 5 (last paragraph), the Applicant argues that Hatanaka does not disclose or suggest amended claims 1, 8, and 9. Hatanaka, in contrast, discloses at col 3., ll.1-11 a process comprising (1) a first step for hydrodesulfurizing a sulfur-containing diesel gas oil feedstock, (2) a second step for separating the hydrodesulfurized diesel gas oil feedstock into light fraction and heavy fraction, (3) a third step for hydrodesulfurizing further the separated heavy fraction, and (4) a fourth step for mixing the further hydrodesulfurized heavy fraction and the separated light fraction. Hatanaka, however, neither discloses nor suggests simultaneous desulfurization and dearomatization.

The Applicant's argument is not persuasive because the claimed invention does not exclude separation (step 2), desulfurization of heavy fraction (step 3), and mixing (step 4). Hatanaka invention discloses, "As the light fraction separated by distillation scarcely contains sulfur, it can be used as itself as a deep desulfurized diesel gas oil" (See column 5, lines 3-5). Obviously, Hatanaka produces a gas oil fraction with negligible sulfur content in one step. Also, Hatanaka discloses, "The sulfur content in the diesel gas oil product can be decided arbitrarily if necessary, and a necessary desulfurization ratio can be achieved by the optimization of reactive conditions of reaction temperature, pressure, and LHSV etc." (Column 6, lines 66-67; column 7, lines 1-3). Clearly, Hatanaka can produce sulfur content in any range, including as claimed.

Waku invention discloses a hydrotreating process similar to Hatanaka using feed, catalyst, and operating conditions similar to Hatanaka to produce gas oil containing low-sulfur and low aromatics content (See abstract). Waku starts with a gas oil feed having

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sulfur content of 0.98 wt % and aromatics content of 39% (See column 5, lines 46-48) and produces a hydrotreated gas oil product with sulfur content of about 90 ppm (99% desulfurization) and aromatics content of 17 wt% (56% dearomatization) See Table 2, column 7, lines 27-29). Obviously, Hatanaka's gas oil feed and product should inherently have aromatics content in a range similar to Waku. Assuming the degree of desulfurization and dearomatization achieved by Waku, being achieved in Hatanaka invention also, it is expected that Hatanaka should necessarily produce a gas oil fraction with sulfur and aromatics in a range, including as claimed.

11. In the arguments on page 6 (paragraph 1), the Applicant argues that Waku does not remedy the above-mentioned deficiency of Hatanaka. Waku in contrast, discloses at col. 2, ll. 9-22, a process for desulfurization of distilled petroleum comprising a first step of "putting distilled petroleum into contact with hydrogen gas in the presence of a hydrotreating catalyst to reduce the sulfur concentration to not higher than 0.05 wt%," and a second step of "reducing the aromatic compound concentration in the presence of a noble metal type catalyst." Waku further discloses in col. 2, ll.43-49 that desulfurization takes place in the first step and the aromatic content is reduced in the second step, and that the operation of separating the gas and the liquid components is repeated at least twice between the first step and the second step.

The Applicant's argument is not persuasive because Waku's process is "providing as a feed oil a hydrorefined petroleum-based hydrocarbon oil with a sulfur content of 90 ppm by mass, a total aromatic content of 17% by volume" as required by

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claim 1 (See Waku, column 7, Table 2, lines 27-29). Thus, Hatanaka's product with 10 ppm sulfur (See Hatanaka, column 9, lines 28-29) should necessarily have an aromatic content in a range as claimed (5-15 vol%). Obviously, Hatanaka's disclosure, "As the light fraction separated by distillation scarcely contains sulfur, it can be used as itself as a deep desulfurized diesel gas oil" (See column 5, lines 3-5), should necessarily be producing a gas oil fraction with sulfur and aromatics in the claimed range. Further, as discussed earlier, Hatanaka process can optimize the hydrotreating conditions to produce any target sulfur content, which implies that aromatics content also will simultaneously be controlled to the required specifications.

12. In conclusion, the claimed invention is *prima facie* obvious over Hatanaka in view of Waku.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS 071009

/In Suk Bullock/
Primary Examiner, Art Unit 1797